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TRANSLATIONS ON TELECOMMUNICATIONS POLICY, RESEARCH AND DEVELOPMENT

No. 15

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CHI TENG-KUEI MEETS FRG BROADCASTING DELEGATION

OW131314Y Peking NCNA in English 1243 GMT 13 Sep 77 OW

[Text] Peking, September 13, 1977 (HSINHUA)--Vice-Premier Chi Teng-kuei met with the delegation of the television Zweites Deutsches Fernsehen (ZDF) of the Federal Republic of·Germany here this afternoon.

Members of the delegation present on the occasion were Jockel Fuchs, chairman of the Council of the Television 2 ZDF; Christian Schwarz-Schilling, representative of the Christian Democratic Union to ZDF; Reinhard Appel, editor-in-chief of ZDF; and Gerhard Dambmann, ZDF correspondent in Tokyo.

Erwin Wickert, ambassador of Federal Germany to China, was present.

Vice-Premier Chi Teng-kuei had a friendly conversation with the friends from Federal Germany.

Also present were Li Lien-ching, deputy director of the Central Broadcasting Administration, and Tai Lin-feng, director of the Peking television station.

CSO: 5500

VNA DELEGATION ATTENDS INFORMATION CONFERENCE IN SOFIA

Hanoi VNA in English 1515 GMT 17 Sep 77 OW

[Text] Hanoi VNA Sep 17--A delegation of VIETNAM NEWS AGENCY led by its director General Dao Tung attended the conference of directors-general of news and photo agencies and press organs of socialist countries held in Sofia from September 13 to 16.

The conference discussed and exchanged experience in: news and photo in-formation work, improvement of the material and technical bases of radio transmission and reception in keeping with the progress of modern science and techniques, and strengthening of cooperation among news agencies to counter the fallacious propaganda of imperialism.

Other participants in the conference included the delegations of Bulgaria, Cuba, Czechoslovakia, the German Democratic Republic, Hungary, Mongolia, Poland, Romania and the Soviet Union.

Following the conference, Onyan Zoinov [name as received] and D. Stanichev, secretaries of the central committee of the Bulgarian Communist Party, and Stoyan Mikhailov, chairman of the Propaganda and Mobilization Board of the BCP's Central Committee, received and had a cordial talk with the delega-tions.

CSO: 5500

BRIEFS

INTERSPUTNIK SATELLITE AGREEMENT--Moscow, 16 Sep TASS--An agreement between the Soviet Government and the international organization "Intersputnik" was signed here. It is established by the agreement that the organization's directorate will work in Moscow. The agreement also envisages creating the most favourable conditions for the activity of the organization in the USSR. "Intersputnik" was formed in November 1971, by nine socialist countries: Bulgaria, Hungary, the GDR, Cuba, Mongolia, Poland, Romania, the USSR and Czechoslovakia. The organization's purpose is designing, creation, maintenance and development of the international communications systems with the use of sputniks and complexes on the ground. The system must meet the needs of the member-countries in channels for colour and black-and-white television and telephone-telegraphcommunications. [Text] [Moscow TASS in English 1029 GMT 16 Sep 77 LD]

CSO: 5500

KIM IL-SONG RECEIVES PRC TELECOMMUNICATIONS DELEGATION

SK140356Y Pyongyang KCNA in English 0344 GMT 14 Sep 77 SK

[Text] Pyongyang September 14 (KCNA)--The great leader Comrade Kim Il-song
on September 13 received the posts and telecommunications delegation of the
People's Republic of China. Present on the occasion were the members of
the delegation headed by Comrade Chung Fu-hsiang, minister of posts and
telecommunications of the PRC. Personages concerned Kim Yong-chae and Yi
Chong-mok were on hand. Lu Chih-hsien, ambassador extraordinary and pleni-
potentiary of the PRC to our country, was also present there. The great
leader Comrade Kim Il-song had a talk with the guests in a cordial and
friendly atmosphere.

CSO: 5500

BRIEFS

SOUTH SULAWESI TRANSMITTER--Ujungpadang, Sep 8--South Sulawesi Governor Achmad Lamo has said that with the completion of a 100-kilowatt Radio Republik Indonesia [RRI] Ujungpadang transmitter, people in South Sulawesi will be assured of a better broadcast reception than in the past. The governor said this following an inspection of the new transmitter at (Pontosuri) in Gowa district. He said the new RRI Ujungpadang transmitter is capable of overpowering foreign station broadcasts which were formerly very clearly heard in the South Sulawesi capital. [Text] [Jakarta Domestic Service in Indonesian 1500 GMT 8 Sep 77 BK]

TELEVISION RECEPTION IN ACEH--Most parts of Aceh Province will be able to tune on Jakarta television programs as of May 1978, but in view of geographical conditions, west and south Aceh districts will be able to do so only by the end of 1978 when the special relay station is completed. The Bangaaceh television relay station has been operating from this month using Channel 3. [Jakarta Domestic Service in Indonesian 1200 GMT 17 Sep 77 BK]

CSO: 5500

HIGH SPEED SINGLE LINE CONTROLLER DESCRIBED

[Article: "The High Speed Single Line Controller (H-SLC) for Computer-Computer Communications", by Kazuyoshi Morino, Nippon Denshin Denwa Kosha [Nippon Telephone and Telegraph Corporation, abbreviated NTT], Data Communications Research Division, Yokosuka Telecommunications Research Institute, Line Controller Research Laboratory; Hiroshi Miharu, Computer Technology Headquarters, Methods Technology Division; Keitaro Sano and Hakobu Miyahara, Peripherals Headquarters, First Technical Division; Hidemi An NTT Systems Headquarters, First Systems Division; Shigeo Igai, NTT Systems Headquarters, Second Systems Division]

[Text] Summary

This paper describes the High Speed Single Line Controller (H-SLC) that supports high level data link control procedures, which has recently attracted special interest for application of computer to computer communications with high speed data transmission line.

1. Foreword

For several years, accompanying the expansion of the size of data communication systems and their area of application, there has been a rapid increase in the demand for high speed data transmission between and among computers. Not only the use of specialized circuits, but also the materialization of high speed data transmission via a data exchange network is now under consideration.

Traditionally, the study of this field revolved mainly around the basic mode, data line control procedures. For computer to computer data transmission, a newer data link control procedure that is superior to this basic mode procedure in performance, reliability and symbolic logic selection became necessary; and standardization of a high level data link

control procedure (hereafter referred to as high level procedure) is being sought by the International Standards Organization and other bodies.

In view of these developments, we developed a High Speed Single Line Controller for experimental use at NTT's Telecommunications Research Institute, and as one system component for developing a new data link system that employs a high level procedure.

As a result of connecting this controller to the NEAC-3200, we verified that it is suitable for high speed data transmission and that it uses the circuits efficiently. We were also able to verify that it can effectively be used for new data link systems.

We would like to introduce the said High Speed Single Line Controller (H-SLC) below and submit it for public scrutiny.

2. Outline of H-SLC

H-SLC was connected to the central processor. A synchronous communication line was assigned in order to control full duplex transmission following a high level procedure. H-SLC has the following characteristics.

(1) It carries out high speed data transmission at a communication speed of 2.4 kilobit per second to 48 kilobit per second.

(2) There is no control with respect to data transmitted and it operates on a bit oriented transparent mode which enables transmission of all bit patterns.

(3) It can be used not only on specified data communication lines (private lines) but on public communication circuits as well.

(4) By means of addition of frame check sequence (FCS), detection, and supervision of received data format, transmitted data can be protected.

(5) In order to raise data transmission efficiency with the Dentral Processing Unit (CPU), multiple channels can be used as transmission channels. Moreover, transmission/reception buffer chain via program can easily be effected, thus enabling continuous data transmission/reception.

3. Components and Specifications

3.1 Components

Structure of H-SLC is enumerated in Table 1 and its block diagram is indicated by Figure 1.

Table 1. System Components of C-6140 High Speed Communication Controller

(1) 型　名	(2) 品　　名	(3) 備　　　考
C-6140A	高速通信制御部 (4)	2.4Kビット/秒≦通信速度≦20Kビット/秒 ハイレベル手順　1回線収容 (6)
C-6140B	高速通信制御部 (4)	20Kビット/秒＜通信速度≦48Kビット/秒 ハイレベル手順　1回線収容 (7)
C-6146	高速通信制御部用 DMC機構 (5)	送信用DMC付加チャネル C-6140A、Bに1台付加される (8)

Key:

1. Model
2. Product name
3. Comments
4. High Speed Communication Controller
5. DMC component for High Speed Communication Controller
6. 2.4 K bit/second ≦ transmission speed ≦ 20 K bit/second high level procedure   single circuit assignment
7. 20 K bit/second ＜ transmission speed ≦ 48 K bit/second high level procedure   single circuit assignment
8. DMC attachment channel for transmission--1 unit to be attached to C-6140A, B

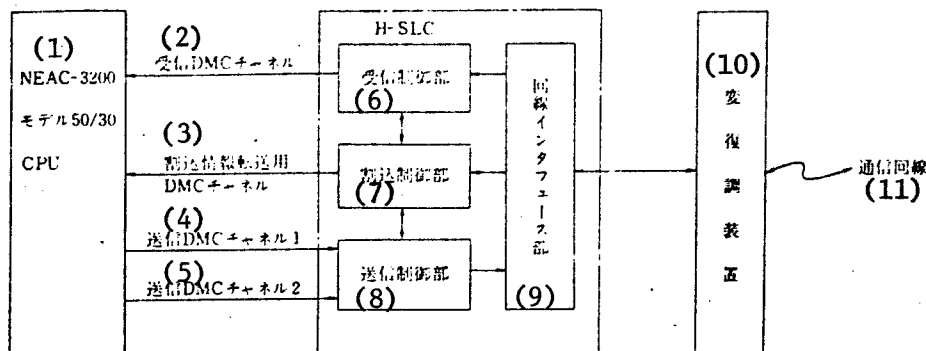Figure 1. Block Diagram of C-6140 High Speed Communication Controller

Key:

1. NEAC-3200, Model 50/30 CPU
2. Reception DMC channel
3. DMC channel for interruption data transfer
4. Transmission DMC channel 1
5. Transmission DMC channel 2
6. Reception controller
7. Interruption controller
8. Transmission controller
9. Line interface
10. Modulation-demodulation unit [Modem]
11. Communication line

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3.2 Standards

H-SLC's standards are as follows:

Temperature: 0-40 degrees Centigrade

Humidity: 30-85 percent

Other: It is incorporated within NEAC-3200 drawer and power is supplied by NEAC 3200

3.3 Functional specifications

(1) Number of assigned circuits: one full duplex line

(2) Kind of circuit: Specific communication lines and public communication lines

(3) Communication speed: C-6140A is more than 2.4 kilobit per second, less than 20 kilobit per second. C-6140B is more than 20 kilobit per second and less than 48 kilobit per second.

(4) Communication format: full duplex or semi-duplex

(5) Synchronous format: synchronous (synchronous bit is executed using Modem's transmission timing signal ST2 and synchronous frame is made possible through F sequence.)

(6) Symbolic unit used: 8 units

(7) Error detection:

1. Received message FCS check error: FCS check of data received. (See Section 3.4)

2. Received message format error: Format of received data is inspected and when the receiving bit of data frame surrounded by F sequence is less than 32 bit, format error is declared.

3. Received message over-run error: Error is detected when data transmission between H-SLC and CPU fails to comply with data reception circuit speed.

4. Transmission under-run error: Detection when data transmission between H-SLC and CPU fails to follow the speed of data transmission to circuits.

(8) Connection with CPU: One NEAC-3200 DMC (Data Multiplex Channel) channel is used for received data transfer, transmitted data transfer,

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interruption data transfer respectively. One more channel can be used for transfer of transmitted data by means of C-6146 attachment.

(9)   Interface with Modem: C-6140A conforms to C.C.I.T.T. V24 directive and C-6140B conforms to C.C.I.T.T. V35 directive.

(10)   Inspection and control of circuits: In order to discover circuit obstacles, dislocation of Modem's CD (Carrier Detection) signal and DR (Data Set Ready) signal is inspected for circuit dislocation error. Data transmission control is effected by CS (Commence Transmission) signal, interruption into CPU by detection of CI (Call Indication) signal, DR signal, on and off control by ER (Peripheral Equipment Ready) signal and RS (Request Transmission Service) signal.

3.4   Structure of Frame That H-SLC Supports

The basic structure of the frame that H-SLC supports and the respective element's bit composition is indicated in Figure 2.

F (1) シーケンス	A (2) フィールド	C (3) フィールド	(4) (情報フィールド)	FCS (5) フィールド	F (1) シーケンス
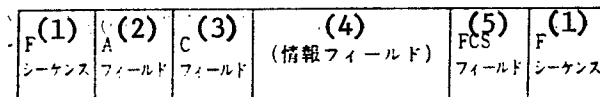
Fシーケンス：フラグシーケンス………ビット構成は01111110

Aフィールド：アドレスフィールド……8ビット

Cフィールド：制御フィールド………8ビット

(情報フィールド)…………………8×nビット

FCSフィールド：ブロックチェックシーケンス…16ビット

Figure 2.   Basic Information Regarding Frame Composition

Key:
1.   F sequence
2.   A field
3.   C field
4.   (Data field)
5.   FCS field

F sequence: flag sequence.....Bit construction is 01111110
A field: address field.....8 bit
C field: control field.....8 bit
(Data field).................8Xn bit
FCS field: block check sequence.....16 bit

Data field is employed only when necessary and is made up of 8Xn (n is a discretionary number). FCS is made up of a surplus when a bit line-up consisting of A, C (Data Field) is divided by a constituent polynominal

expression $X^{16}+X^{12}+X^5+1$. In case of data transmission, FCS is automatically appended via H-SLC. In the case of data reception, detection is automatically performed within H-SLC and when error is detected as a result, it is regarded as a FCS check error and CPU is notified.

Moreover with respect to transmission and reception of a frame, the following operations are performed within H-SLC.

1. A, C (Data Field) are sent out at low level bit and FCS is sent out from a higher bit.

2. Bit operation within A, C (Data Field) and FCS.....With respect to data transmission, after sending out five consecutive "1", "0" is always inserted. However, this operation is deleted for F sequence and abort sequence. In message reception, when five consecutive "1" is received and immediately thereafter, "0" is received, that "0" is deleted and the result thereof is the received data. In these operations, there is no recurrence of F sequence nor appearance of a pattern identical with an abort sequence (to be discussed below) in the A-FCS of the frame surrounded by F sequence. Therefore CPU may send out data of whatever pattern and it can accurately be reconstructed on the receiving end.

3. As a pattern for aborting the data in transmission, there is the abort sequence. The bit pattern is 01111111 and it is sent out on a circuit from "0" bit. In the case of message reception, when more than seven consecutive "1" are received, it indicates the receipt of abort sequence. The in-transmission abort is used to effect extraordinary termination of transmission block during transmission so that the receiving end would abort the block that it is receiving.

4. Operational Outline

H-SLC's operation may broadly be classified into transmission, reception and interruption.

4.1 Transmission

Transmission begins with CPU's commence transmission command after Modem becomes operational. The transmitted data passes from CPU's memory at the rate of one word 16 bit via DMG channel appropriated for transmission and is sent to H-SLC. One word data that has been sent to H-SLC is sent out onto the circuit via Modem unit's transmission timing (ST2 signal)-- first left half character then right half character; within half character, from lower level bit--while performing the operation described under 3.4-2. In this instance, the transmitted data's initial and final F sequences and the 16 bit FCS sequence are automatically added on within H-SLC. Figure 3 is a flow chart of this operation. End of transmission is indicated by stop transmission message from CPU or detection of end of data

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transfer on a DMC channel (End of Range). In addition to sending data from
CPU, H-SLC's transmission operation can perform continuous transmission of
F sequence and abort sequence by command. In transmitting messages, two
DMC channels may be used and by using the two channels alternately by switch-
ing back and forth, it is possible to effect H-SLC-CPU data transfer effi-
ciency.

4.2 Message Reception

As with transmission, after Modem has become operational, reception begins
with commence message reception command from CPU. From the bit line-up of
received data, H-SLC first of all detects the F sequences and establishes
synchron pattern. Thereafter, while performing the operation described
under Section 3.4-2, data is grouped into 8 bit units and processed follow-
ing the sequence of left half character of one word, then the right half.
Then, following one word unit standard, they are sent through a DMC channel
assigned for message reception onto CPU memory. This operation continues
until the next F sequence is detected. With regard to the 16 bits imme-
diately preceding the said F sequence, that is, with regard to FCS sequence,
CPU is notified only when there is error in computation. The final F se-
quence does sometimes double as the next frame's initial F sequence; thus
the reception operation is again resumed. H-SLC structure is such that
the data transfer area to CPU may be changed at any time by programming.
The message reception buffer chain is extremely flexible. Stop message
receipt command from CPU ends message reception.
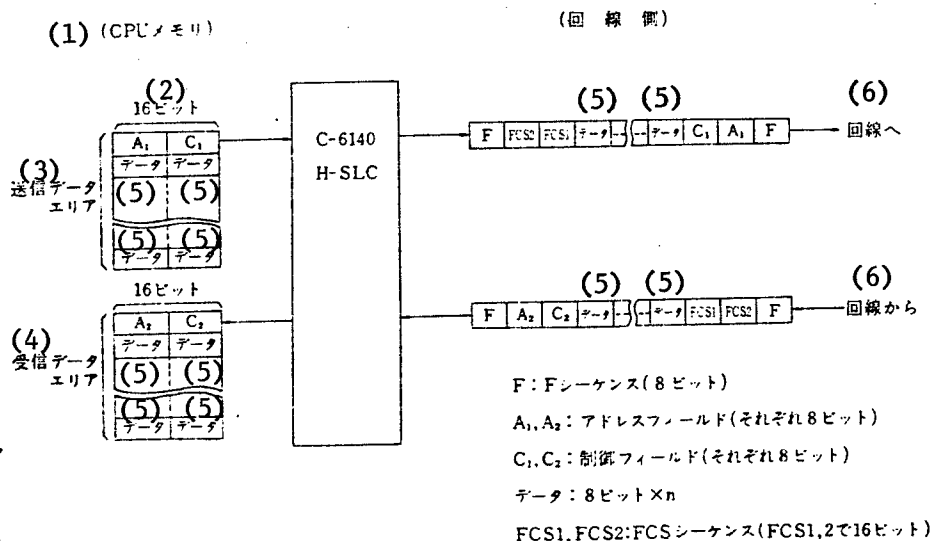
Figure 3. Data Flow of Receiving and Transmitting

Key: 1. (CPU memory)   F: F sequence (8 bit)
      2. 16 bit A_1, A_2: address field (8 bit each)
      3. Transmitted data area C_1, C_2: control field (8 bit each)
      4. Received data area   Data: 8 bit X n
      5. Data   FCS1, FCS2: FCS sequence (FCS1, 2 --
      6. To circuit   16 bit)

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4.3 Interruption

When conditions enumerated in Table 2 arise and when interruption is permitted by CPU, H-SLC transfers to CPU through DMC channel designated for interrupt data transfer, an interrupt information which indicates what type of interruption it is; and thereby accomplishes this operation. Under interrupt conditions related to message reception indicated in Table 2, interrupt address (address of received data that was being transferred to CPU when interrupt condition arose) is sent following the interrupt information.

Table 2. Interruption Condition List

	(1)割込の種類	(2) 検 出 の 原 因
(3)受信関係	Fシーケンス受信(6)	データ終了のFシーケンスを受信 (18)
	放棄シーケンス受信(7)	データ受信中に放棄シーケンスを受信 (19)
	受信エンドオブレンジ(8)	受信DMC転送でエンドオブレンジを検出 (20)
	受信オーバフロー(9)	CPUとのデータ転送が回線からのデータ受信速度に追従できなかったことを検出 (21)
	アクセスアドレス切断(10)	プログラムが受信データエリアのバッファチェインを行なったとき (22)
	FCSチェック誤(11)	受信のFCSチェックエラーを検出 (23)
	受信フォーマット(12)	受信データの情報フレームが32ビット未満の場合 (24)
(4)送信関係	送信エンドオブ(13)	送信DMC転送でエンドオブレンジを検出 (25)
	送信アンダフロー(14)	CPUのデータ転送が回線へのデータ送信速度に追従できなかったことを検出 (26)
(5)回線関係	CIオン (15)	変復調装置インタフェースCIがオンとなったとき (27)
	DRオン (16)	変復調装置インタフェースDRがオンとなったとき (28)
	回線断エラー (17)	変復調装置インタフェースCDまたはDRが通信中にオフとなったとき (29)

Key:
1. Type of interruption
2. Cause of detection
3. Message reception related
4. Transmission related
5. Circuitry related
6. F sequence receipt
7. Abort sequence receipt
8. Message receipt end of range
9. Message receipt overflow
10. Access address cut-off
11. FCS check error
12. Message reception format error
13. Transmission end of range
14. Transmission underflow
15. CI on
16. DR on

[Key continued on following page]

17. Circuitry dislocation error
18. Received F sequence for end of data
19. Received abort sequence during data reception
20. Detected end of range through message receipt DMC transfer
21. Detected that CPU data transfer was not able to follow data reception speed from the circuits
22. When the program performs buffer chain of received data area
23. Detected FCS check error on message received
24. When data frame of received data is less than 32 bit
25. Detected end of range on the transmitted DMC transfer
26. Detected that CPU data transfer speed was not able to follow the data transmission speed to the circuits
27. When Modem interface CI is on
28. When Modem interface DR is on
29. When Modem interface CD or DR is turned off during communication

Table 3. Command List of C-6140

(1) 命令の種類	(2) 命　　令	(3) 命　令　の　説　明
受信関係 命令 (4)	送信開始 (8)	送信動作を開始する。 (25)
	送信停止 (9)	送信動作を停止し放棄シーケンスを連送する。(26)
	送信休止 (10)	送信停止状態でFシーケンスを連送する。 (27)
	送信チャネル切替 (11)	送信用DMCチャネルの自動切替えを行なう。 (28)
	送信状態チェック (12)	送信動作が停止状態にあるかどうかをチェックする。 (29)
	送信チャネルチェック (13)	送信用DMCチャネル2チャネルのうちどちらが使用されているかをチェックする。 (30)
送信関係 命令 (5)	受信開始 (14)	受信動作を開始する。 (31)
	受信停止 (15)	受信動作を停止する。 (32)
回線関係 命令 (6)	ERオン (16)	ER(端末装置レディ)をオンにする。(33)
	ERオフ (17)	ER(端末装置レディ)をオフにする。(34)
	RSオン (18)	RS(送信要求)をオンにする。 (35)
	RSオフ (19)	RS(送信要求)をオフにする。 (36)
	DRチェック (20)	DR(データセットレディ)の状態をチェックする。(37)
	CDチェック (21)	CD(キャリア)検出の状態をチェックする。(38)
割込関係 命令 (7)	割込許可 (22)	H-SLCの割込みを許可する。 (39)
	割込リセット (23)	H-SLCの割込みをリセットする。 (40)
	割込チェック (24)	H-SLCが割込みをかけているかどうかをチェックする。 (41)

Key:
   1. Type of command
   2. Command
   3. Explanation of command
   4. Message reception related command
   5. Transmission related command

6. Circuitry related command
7. Interruption related command
8. Commence transmission
9. Stop transmission
10. Suspend transmission
11. Transmission channel change approved
12. Check status of transmission
13. Check transmission channel
14. Commence message reception
15. Stop message reception
16. ER on
17. ER off
18. RS on
19. RS off
20. DR check
21. CD check
22. Permit interruption
23. Interruption reset
24. Interruption check
25. Begin transmission operation
26. Stop transmission and send abort sequence in series
27. Stop transmission and send F series in series
28. Perform automatic switchover of DMC channels for transmission
29. Check whether or not transmission has stopped
30. Check which of the two DMC transmission channels are being used
31. Commence message reception
32. Stop message reception
33. Turn on ER (Peripheral Equipments Ready)
34. Turn off ER (Peripheral Equipments Ready)
35. Turn on RS (Request Transmission Service)
36. Turn off RS (Request Transmission Service)
37. Check the status of DR (Data Set Ready)
38. Check CD (Carrier Detection)
39. Permit H-SLC interruption
40. Reset H-SLC interruption
41. Check whether or not H-SLC is interrupting

4.4 Command

The list of commands for controlling H-SLC's operation, for use on CPU
program, is presented in Table 3.

5. Example of Control Program

Verification/evaluation experiments of the high level process, hook-up
communication experiments for verifying and evaluating communication inter-
face between DDX-1 data exchange machine--computer peripherals were con-
ducted at NTT's Musashino Telecommunications Research Institute.

We would like to outline the configuration and operation of H-SLC control program used in these experiments and evaluate its effectiveness.

The configuration of the experimental system is presented in Figure 4.
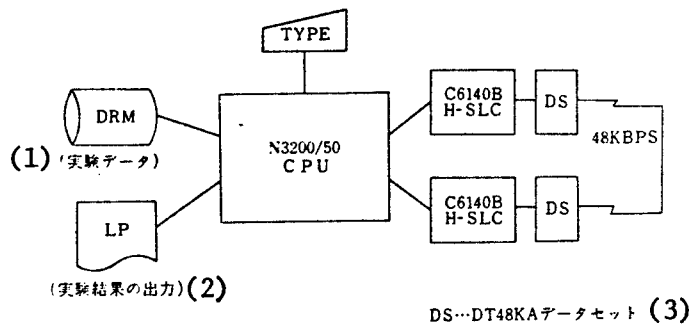

Figure 4. Experimental System Configuration

Key:
1. (Experimental data)
2. (Experimental result's output)
3. DS...DT48KA data set

5.1 Program Configuration

This program consists of following two broadly delineated parts.

(1) Interruption control processing
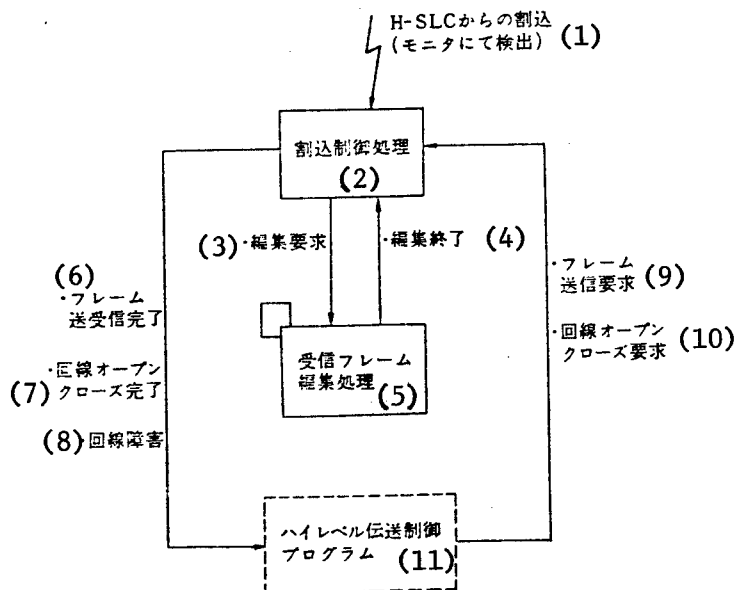(2) Removal processing of received frames

Figure 5. Configuration of H-SLC Control Program

[Key on following page]

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Key:
1. Interruption from H-SLC (detected by monitor)
2. Interrupt control processing
3. Removal request
4. Removal completed
5. Removal operation of received frames
6. Completion of frame transmission and reception
7. Circuitry open/close completed
8. Circuitry malfunction
9. Frame transmission request
10. Circuitry open/close request
11. High level transfer control program

(1)'s main function is processing of interruption and analysis. (2)'s chief function is removal/transfer of received frames to message processing buffer.

The program configuration is presented in Figure 5.

5.2 Operation of the Program

   (1) Interruption Control Processing

1. Common Processing of Interruption

Control of DMC channel slated for interrupt data transfer and analysis of transferred interrupt conditions and apportionment of processing tasks (message reception processing, transmission processing and circuit control processing) are executed. As far as the DMC channel for interrupt data transfer is concerned, once end of range (EOR) is detected, subsequent interrupt data transfer is stopped. Thus buffer for interrupt data transfer is changed prior to DMC detection.

2. Message Reception Processing

Message reception related interruption is performed.

EOR channel for data reception is equipped with two buffers and by alternately switching from one to another, the frame transferred via circuit is received. Buffer conversion is made when receiving DMC's interrupt condition is deleted. During this interval, a request for removal/transfer of frame received by DMC reception buffer is sent to the message processing buffer for each F sequence message receipt interruption.

(See (2) Compilation of message received)

Moreover, having been notified of end of removal operation from message received removal processing, notice of completion of frame reception is given to the high level transmission control program.

Table 4 represents the outline of message reception related interrupt conditions and software operations.

Table 4.   Interruption Conditions and Software Operation

(1)区分	(2)割込条件	(3) 処 理 概 要	
(4)受信関係割込	Fシーケンス受信 (7)	受信DMCバッファ上に受信されたこのフレームをメッセージ処理用バッファへ編集するよう、受信編集処理へ要求する。有効ワード指定、FCSエラー、受信フォーマットエラーなどの情報も同時に通知する。	(17)
	アボートシーケンス受信 (8)	このフレームを無視する。	(18)
	受信EOR (9)	受信DMCバッファのチェンジを行なう。	(19)
	アクセスアドレス不連続 (10)	このアドレスまでメッセージ処理用バッファへ編集するよう受信編集処理へ要求する。	(20)
	受信オーバフロー (11)	強制的にFCSエラーフレームとみなしFシーケンス受信と同じとする。	(21)
(5)送信関係割込	送信EOR (12)	送信待ちのフレームがあれば、現在送信中のフレームが送信完了したら切替えて次のフレームの送信が行なえるように制御する。	(22)
	送信アンダフロー (13)	このフレームの再送を行なう。	(23)
(6)回線関係割込	回線断 (14)	回線クローズを行なう。	(24)
	DRオン (15)	処理なし（DT48KAデータセットとのインタフェースにこの条件を発生させる機能なし）	(25)
	CIオン (16)		

Key:
1. Classification
2. Interruption condition
3. Outline of operation
4. Reception related interruption
5. Transmission related interruption
6. Circuitry related interruption
7. F sequence message received
8. Abort sequence message received
9. Message received EOR
10. Access address discontinue
11. Message received overflow
12. Transmission EOR
13. Transmission underflow
14. Circuitry dislocation
15. DR on
16. CI on
17. Request is made to message received removal processing to remove this frame that has been received on message received DMC buffer onto message processing buffer.
Data such as effective word designation, FCS error, message reception format error are also notified at the same time.

[Key continued on following page]

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18. This frame is disregarded.
19. Message reception DMC buffer is changed.
20. Request is made to message received removal processing to remove up to this address and put it on the message processing buffer.
21. Compulsorily treat it as FCS error frame and regard it in the same light as receiving F sequence.
22. If there is a frame waiting to be transmitted, then switch-over the frame that is currently being transmitted when it is finished, and control it so as to enable transmission of the next frame.
23. Retransmit this frame.
24. Close circuit.
25. No operation (There is no function in the interface with DT48KA data set which will generate this condition.)

Transmission related interruption is processed and transmission request from high level transmission control program is accepted.

Transmission control is applied so that data that has been requested for transmission is sent out onto the circuit as one frame. DMC buffer for transmission uses the request source's message processing buffer which houses the transmitted data.

By using the message transmission DMC attached channel, request for transmission of continuous data may be accepted and after transmission EOR interruption of the preceding frame, automatic switchover to transmission of next frame with insertion of F sequence can be controlled.

By these means, it is possible to transfer data efficiently by effective use of circuits.

4. Line Command Operation

After receiving circuit open/close request from the high level transmission control program, connect/disconnect control between it and the data set (DT48KA data set) is effected via "control" of control lines.

Table 4 outlines circuitry relation interruptions and processing. Figure 6 represents circuitry open/close processing sequence.
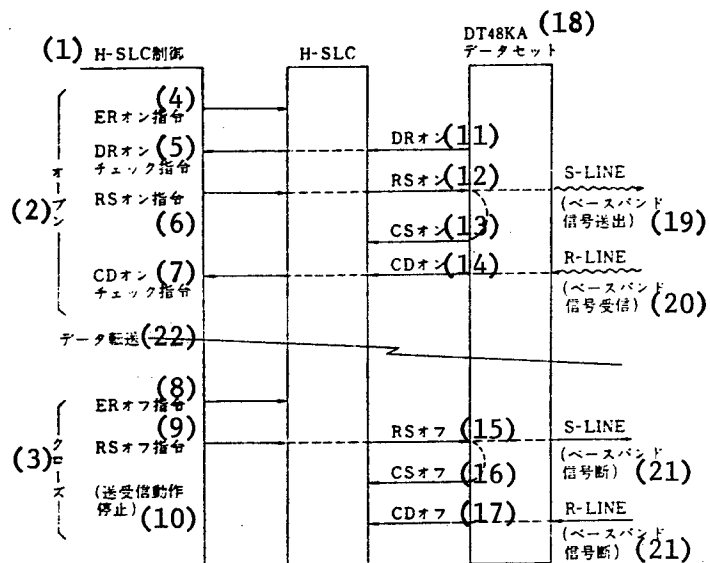
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Figure 6. Control Operation for Data Set Interface

Key:

1.	H–SLC control	13.	CS on
2.	Open	14.	CD on
3.	Close	15.	RS off
4.	ER on command	16.	CS off
5.	DR on check command	17.	CD off
6.	RS on command	18.	DT48KA data set
7.	CD on check command	19.	S–line (base band signal sent)
8.	ER off command	20.	R–line (base band signal received)
9.	RS off command	21.	S–line (base band signal termi-
10.	(Stop transmission/		nated)
	reception)		
11.	DR on		
12.	RS on		

(2) Removal of Received Frame

Following frame removal request from reception interrupt processing, the frame received on DMC reception buffer is removed and transferred to message processing buffer. Because multiple frames are received successively on DMC reception buffer, this operation consists of (1) transfer of one frame onto one buffer for message processing and (2) "setting" the status onto buffer's prefix in order to notify the condition of the received frame to the high level transmission control program.

This operation is carried out with a task level mode which permits interruption.

Figure 7 describes the concept of removal processing.

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5.3 Evaluation of Performance

Measurement results of the current control program's overhead is shown in Figure 8. The conditions of measurement was as follows. It was performed repeatedly using two H-SLC units and circuitry use within the measured range was 100 percent.
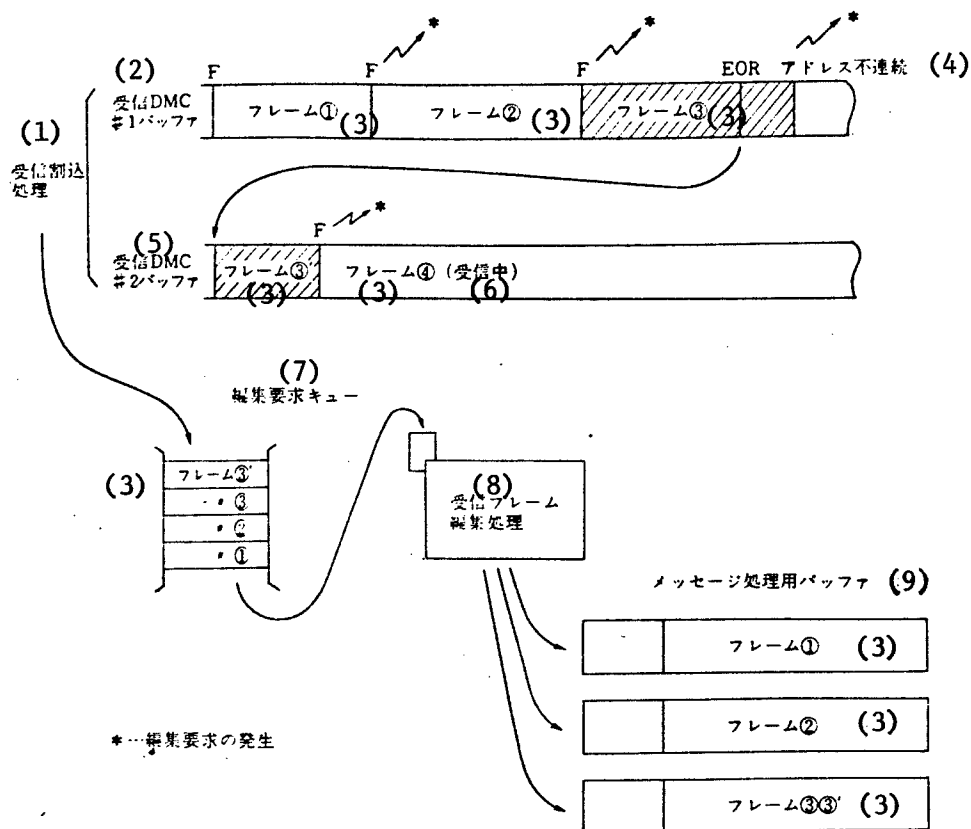

Figure 7. Conceptual Received Frame Removing Operation

Key:
1. Interruption of received message
2. DMC reception #1 buffer
3. Frame
4. EOR address discontinue
5. DMC reception #2 buffer
6. (message reception in progress)
7. Removal request cue
8. Removal of received frame
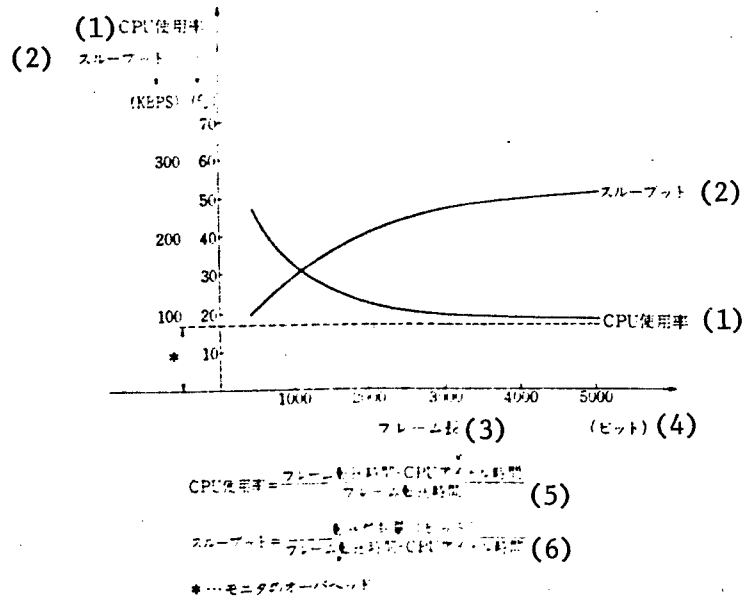9. Buffer for processing message
* Initiate removal request

Figure 8. Performance Measurement

Key:
1. CPU use rate
2. Throughput
3. Length of frame
4. (bit)

5. CPU use rate $= \dfrac{\text{transferred information volume (bit)}}{\text{frame transfer time–CPU idle time}}$

6. Throughput $= \dfrac{\text{frame transmission time–CPU idle time}}{\text{frame transmission time}}$

* monitor overhead

CONCLUSION

The preceding sections described the configuration, operation and an example of control of the High Speed Line Controller which supports the high level data link control process. Along with the increase in the data volume handled by the on-line systems recently, there is an increased demand for high speed communication lines.

The high level data link control process not only raises transmission efficiency by means of continuous data transmission, unaffected by transmission delays, but makes transmission via any agreed upon symbolic format possible. We believe that along with increased demand for faster circuitry speed, its application level will increase significantly.

Since the recent development of Model 70 as the machine to follow minicomputer NEAC 3200 Models 30 and 50, the price of high speed communication

control unit has been lowered, and its efficiency strengthened, and it is being commercialized as C-6140N.

THANKS

In closing, we would like to thank the staff of various sections of NTT Telecommunications Research Laboratory who provided leadership and support in the design development of the unit under discussion.

11460
CSO: 5500

BRIEFS

POLICE-INTERPOL RADIO LINK--The Royal Malaysian Police will soon have radio communications with the Interpol headquarters and member countries of the organization, the director of CID [Criminal Investigation Department], Datuk Abdul Rahman bin Ismail, said. At present Malaysia is one of the few countries having only Telex links with the Interpol secretariat in Paris. He said that Telex links were not very smooth and to communicate with countries with such facilities was difficult. Radio communications would facilitate further information and action can be taken quickly. [Kuala Lumpur Domestic Service in English 0000 GMT 11 Sep 77 BK]

CSO: 5500

BATMONH RECEIVES ITU SECRETARY GENERAL

Ulaanbaatar MONTSAME in Russian 1825 GMT 16 Sep 77 OW

[Text] Ulaanbaatar, 16 Sep (MONTSAME)--J. Batmonh, member of the MPRP
Central Committee Politburo and chairman of the MPR Council of Ministers,
today received M. Mili, secretary general of the International Telecommuni-
cations Union, who is visiting here at the invitation of the MPR Govern-
ment. The meeting, which passed in a warm and cordial atmosphere, was
attended by D. Gotob, MPR minister of communications; D. Saldan, chairman
of the State Committee for Foreign Economic Relations and minister of the
MPR; and other officials, as well as I. S. Bukhtoyarov, permanent repre-
sentative of the UN Development Program in the MPR.

CSO: 5500

LHASA TELEGRAPH OFFICE IMPROVES SERVICE, DEVELOPS SKILLS

Lhasa Tibet Regional Service in Mandarin 1100 GMT 18 Sep 77 OW

[Text] Since the smashing of the Gang of Four, the party branch of the Telegraph Section of the Lhasa Municipal Posts and Telecommunication Bureau has actively led staff members and workers in improving professional competence and developing professional skills thus effectively insuring the successful accomplishment of the region's telecommunication work.

The Telegraph Section of the Lhasa Municipal Posts and Telecommunication Bureau renders various kinds of telecommunication service for party and military organizations and the people of our region. High professional competence is required. However, when the Gang of Four ran amuck, the section's leadership did not dare to pay attention to professionalism and staff members and workers did not dare to develop professional skills. As a result, mistakes were often made, thereby damaging the work of the party.

Acting on Chairman Mao's behests, the party Central Committee headed by wise Chairman Hua smashed the heinous Gang of Four with one stroke. The section's party branch has since discovered the cause for past mishaps and has led all staff members and workers in thoroughly exposing and scathingly criticizing the Gang of Four and in starting a high tide for improving professional competence and developing professional skills.

The Telegraph Division fighting on the forefront has introduced on-the-spot training which will generally improve professional competence. Since the beginning of this year, many comrades have expeditiously and accurately transmitted and received many messages with not one mistake in 10,000 telegrams. To insure early modernization of postal and telecommunication service, the Transmitter and Receiver Repair Division has carried out technical innovations. Modifications have been made to the signal line, the exchange socket and [words indistinct], thus improving efficiency and insuring quality service.

The party branch of the Telegraph Section of the Lhasa Municipal Posts and Telecommunication Bureau is presently leading the broad masses of staff members and workers in thoroughly studying the spirit of the 11th Party Congress. In accordance with Chairman Mao's brilliant inscription for people's postal and telecommunication service, they are determined to work hard to fulfill the eight fighting tasks of grasping the key link in running the country well put forward by Chairman Hua.

CSO: 5500

'PEOPLE'S DAILY' ON MAO'S WORK IN POSTS, TELECOMMUNICATIONS

Peking Domestic Service in Mandarin 2230 GMT 14 Sep 77 OW

[Excerpts of PEOPLE'S DAILY 15 September article by Ministry of Posts and Telecommunications Theoretical Group entitled: "Triumphantly Advance Along the Orientation for People's Postal-Telecommunications Work as Pointed Out by Chairman Mao"]

[Excerpts] "The Posts and Telecommunications Departments are the nerve system of the party and state. They are an important means for the consolidation of the dictatorship of the proletariat and constitute a component part of the national economy. In order for the state to realize the 'four modernizations,' the posts and telecommunications must be modernized as quickly as possible. The great leader Chairman Mao was very concerned about the modernization of posts and telecommunications during his lifetime. A brilliant inscription was written by him for the communications workers as far back as in 1941 which told them that 'You are the scientific eye and ear that are far-reaching.' In 1956 when he was listening to a report by the responsible comrades of the Ministry of Posts and Telecommunications, Chairman Mao instructed that it was necessary to adopt modern communications techniques and establish trunk lines for wave carriers and cables. In 1965 Chairman Mao sternly pointed out: 'Posts and telecommunications are a backward nerve which still lags 20 years behind. You must strive to catch up.' These important instructions by Chairman Mao were a tremendous impetus and effective encouragement to the workers in the postal and telecommunications field. The postal and telecommunications workers and staff all over the country were inspired to vigorously strive to modernize posts and telecommunications and catch up with and surpass the advanced world level."

"Now postal and telecommunications offices are found everywhere, the communications lines and networks cover every corner of the country, various modern techniques and equipment are being adopted on a large scale, and a profound change is taking place in the communications and capabilities. Our country is beginning to join the advanced world ranks in the postal and telecommunications technique."

"We are determined to display revolutionary enthusiasm plus death-defying spirit, go all-out for revolution, seize the day and seize the hour and make big changes. We will strive to realize within the next 3 years the goal of establishing and all-round adoption of a complete network of large, closed-circuit carrier-wave cables and microwave communications trunk lines, and of having automatic telephones, carrier wave circuits, facsimile transmission of telegrams and motorized delivery available in the main for the more than 2,000 counties and cities throughout the country. We will strive to achieve electronic, automated and mechanized techniques and equipment in posts and telecommunications in an all-round way by 1985, and advance courageously to attain the goal of catching up with and surpassing the advanced world level before the end of this century."

CSO: 5500

BRIEFS

SZECHWAN COMMUNE'S BROADCASTING--(Kuanyin) Commune in Pengshan County has vigorously developed wired broadcasting since 1970. Wired broadcasting now covers all the commune's 13 brigades and 112 production teams, with a total of 4,390 loudspeakers. Apart from relaying programs of the central and provincial broadcasting stations three times a day, the commune amplifier station also puts out its own programs at fixed schedules. Since the 11th Party Congress, these programs have propagated the spirit of the congress and its documents. [Chengtu Szechwan Provincial Service in Mandarin 2140 GMT 15 Sep 77 HK]

CSO: 5500

COMMUNICATION EQUIPMENT PRODUCED AT RUSE DESCRIBED

Sofia OTECHESTVEN FRONT in Bulgarian 2 Sep 77 p 2

[Article by M. Keremidchiev, okrug correspondent: "Producer of [Telephone] Informants -- Ruse Industrial Communications Enterprise Expands Its Production Activity"]

[Translation] At any time of day a person can use the services of an automatic telephone informant which gives information about train and bus traffic and films showing at the movies during the week, tells the exact time etc. These apparatuses are produced at the Ruse Industrial Communication Enterprise as part of the enterprise's extensive production program with nearly 180 product types. Specialists are well acquainted with the matching device for the selection of subscriber's stations in private branch exchanges, by means of which the durability of telephone equipment is increased and subscribers themselves are helped to a considerable extent. Production of the telephone sets that will replace the operators in private branch exchanges began this year. Such an automatic device is installed in the enterprise itself, and for easier explanation let me use the telephone of the deputy director for economic matters, with whom I had a chat the other day. Comrade Dimitur Tsvetkov has extension phone number 230. However, if a party dialing from the outside prefixes this number with the code number 452 designated for the plant, he can then talk to him without the mediation of the plant telephone operator. Considering that the enterprise already produces automatic devices for other exchanges as well, we can imagine what effect this has for the country, since we are not dealing here with just a reduction in the number of items. A similar effect is also obtained from the dial exchange facilities that they produce for the remote command of radio centers. Another necessary apparatus which is improved from year to year. The enterprise makes indispensable measuring instruments such as an apparatus that automatically checks the state of trunk lines in dial telephone exchanges, a cable warning device that monitors the insulation resistance of cable lines, a radio-relay network troubleshooter etc.

Something new for the enterprise are automatic devices to perform postal services. A card-vending machine has a simplified principle and a long service life. Automatic newspaper and magazine-vending machines are being put into production. The machine is included in the CEMA program and regular production of it will start at the beginning of next year. The retransmitters that they produce are highly rated.

The results of half-year performance are very good. The production program is 106.83 [percent] accomplished, per-capita labor productivity reached 107.97, while social productivity rose to 113.76. Inputs per 100 leva of output were cut to 66.81 leva as against the targeted 71.15. The report period showed again 124.69 percent fulfillment of the profit plan.

Attention is now turned towards constant improvement of technology. A survey made in order to raise the social productivity of labor has resulted in the introduction of additional mechanical equipment in the workshops. Individual components are designed, and with the narrower specialization that has been introduced, every worker stays at the place where he is most useful.

None of the people I talked to failed to mention the measures that are being taken to prepare for the next production year 1978. The production program is fully spelled out and tailored to uniform apportionment of the plan over the five-year period year by year, month by month, and day by day. The workshops are providing matrices, billets for bending, templates for cutting, and other additional equipment to lighten human labor. Conditions are being made ready to introduce the mechanized cleaning and tinplating of elements. New process lines will be started up that will result in a further increase in labor productivity. The plant's comprehensive measures include the new organization of payment as well as a social survey of labor that will lead to the discovery of new opportunities for improving the organization of production and manufacturing method.

6474
CSO: 5500

POLITICAL ISSUES RAISED BY SATELLITE TV VIEWED

Warsaw TRYBUNA LUDU in Polish 12 Sep 77 p 7

[Article by Dr Andrzej Gorbiel]

[Text] Satellite telecommunications, or the utilization of artificial
earth satellites for communications purposes, is undoubtedly the area of
the achievements of astronautics which is currently distinguished on a
global scale by the widest dissemination. Its various practical benefits
are already today shared by a significant number of countries. It is
characterized by a utility which is directly felt by millions of
inhabitants of the entire globe.

The manifold detailed legal problems associated with this have become the
subject of many international agreements. A large role in resolving them is
being played by international technical organizations, such as the UN
International Telecommunications Union "Intelsat," which includes over 80
capitalist and developing countries, and "Intersputnik," which was established
by nine socialist countries.

Continual improvements and further spread and intensification of technical
means of satellite telecommunication, create also an urgent need for
resolving on an international plane the more general questions of a political
and legal nature. These are linked primarily with the dynamic development
of the technology of transmitting television programs.

Space craft placed in orbit around the earth are used on a wide scale to
emit programs which are received through the medium of ground relay stations.
The near future is to bring the dissemination of a subsequent achievement
of space technology: transmitter devices which will make possible the
direct reception of programs from satellites, first with the help of
specially adapted television receivers and, in the next stage of technical
development, with the help of mass produced standard television receivers.

And it is precisely the application of the newest method of direct television
transmission which requries particularly painstaking regulation on account
of its implications of a political nature. Awareness of their gravity
inclined the UN General Assembly to enact in 1972 a resolution stating that

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"it is a matter of necessity to work out principles defining the exploitation by countries of artificial satellites for the purposes of direct relevision in order to negotiate one or several agreements of an international character."

In 1974, the Legal Space Subcommittee of the UN started to draft, on the basis of submitted proposals, the single text of principles which was envisioned by the resolution of the General Assembly. The following years brought about the formulation of nine detailed drafts of this kind for the future international convention. At the top place was the scheme postulated by the Soviet Union, which stated that "the activity in the area of international direct satellite television should be carried out in a manner conforming to the development of mutual understanding and to the strengthening of friendly relations and cooperation among all countries and all nations in the interest of maintaining international peace and security."

The most lively discussion was evoked by the matter--undoubtedly the most important--of what answer to give to the question whether the transmission of programs onto the territory of another country requires its prior consent.

The countries of the socialist community consistently represent the viewpoint that use of satellite technology for direct television emissions without consent is impermissible, since it would constitute an obvious violation of the sovereignty of the country for whose territory such emissions were intended. This is because there is a serious danger of misuse of modern technology for the furtherance of activities in conflict with the national interests of countries which are protected by the law of nations, for impermissible interference in their internal affairs, for carrying out ideological subversion, for propagandizing the slogans of militarism and the ideas of racial or national hatred or discrimination, or finally for the dissemination of material offensive to moral or customary standards adopted by a country. Indeed, we already have to deal with such attempts, organized in an obvious manner, on the radio waves--let us recollect Radio Free Europe or other anti-Communist broadcasting stations.

The position of the socialist community met with wide support on the part of the Third World countries and several Western countries (e.g., France). Nevertheless, the United States and several other capitalist countries (including Great Britain, the FRG, and Belgium), bandying around the legally completely meaningless slogan of assuring full freedom for the exchange of ideas and information, oppose any limits on the permissibility of emissions directed beyond their borders.

And this obstructive stance of a handful of Western countries has already for a lengthy period of time rendered impossible an agreement upon a final text of a convention settlement of the matter under discussion. The issue, however, becomes ever more urgent, and it should be resolved in accordance with the interests of peaceful international cooperation.

CSO: 2600

BRIEFS

NEWS BAN LIFTED--The Colombian Government today repealed the measures on radio and television news coverage of illegal stoppages and strikes which had been adopted early this week. The minister of communications issued the following circular to that effect: In order to restore normalcy throughout the national territory and especially in Bogota, the government suspended the restraints which it became necessary to impose by means of Decree No. 2066 on radiobroadcasting stations and television channels. The decree banning reports, declarations, communiques or comments on illegal walkouts, stoppages or strikes from being carried by those media has been repealed. [Text] [Bogota Radio Santa Fe in Spanish 2330 GMT 16 Sep 77 PA]

CSO: 5500

PRESIDENT INAUGURATES NEW RADIO TRANSMITTER

Guatemala City Domestic Service in Spanish 1618 GMT 16 Sep 77 PA

[Speech by Guatemalan President Kjell Eugenio Laugerud Garcia at dedication
ceremony in Guatemala City for new transmitter of Radio Nacional--life]

[Excerpts] The fact that Guatemalans cannot hear Radio Nacional [Guatemala
City Domestic Service] beyond 30 km from the main studio was what prompted
my talk to Radio Nacional director Gen Sergio Lorenzana, with whom I
discussed the possibility of installing the necessary equipment to have
Radio Nacional transmissions heard not just in the interior of the republic,
but beyond our border with our message to the world. This is even more
important now that our country is determined to recover the territory of
Belize through all peaceful means available. However, as I have said before,
although we would like it to be that way, we are not going to hesitate to
take up arms if necessary if Great Britain tries to humiliate the Guatemalan
people. This is one of the reasons why Radio Nacional should be heard in
all the 23 departments, including Belize Department.

Although expenses have been high, I feel it is money well invested. Money
spent for the benefit of the Guatemalan people is money well invested. We
are not installing this equipment which goes on the air today just for the
sake of it. What good is it to have a 100 kw transmitter, such beautiful
and expensive equipment, if the people are going to turn off their radios
or move the dial to another frequency because Radio Nacional programs do
not attract their interest?

If this should be the case, then we have wasted our money. Therefore, I
have told Lorenzana and the technicians from Radio Nacional that programs
should not necessarily be just entertaining, educational, or transmit
patriotic messages to the four corners of the republic, but they must be of
interest to all Guatemalans. This should not be just the most powerful
station in the country, but the one with the largest audience because of
the programs it carries. I am asking Ricardo Arguedas Martinez, communica-
tions and public works minister, to coordinate with the other nine ministries
to form a committee in charge of planning government news of interest to the
people so that they may know what the government is doing.

It is a shame that our people in border towns only listen to foreign stations. In the western part, everybody listens to Mexican radio stations and in the east, Honduran and Salvadoran. Unfortunately, and disgracefully for Guatemala, we have the permanent and constant bombardment from Radio Havana poisoning the minds of Guatemalans with Castroism, the worst opium there is for Central America. We must neutralize its affect, not just by having a powerful 100-kilowatt station, which has the same power as Radio Havana, but by carrying more and better programs.

I insist on Radio Nacional being the best radio station in the country, not because it is the most powerful, but because of the type of programs it carries for the people of Guatemala, whom it is our duty to serve.

We must also carry news for our countrymen abroad, so that they do not feel too lonesome wherever they are.

Ladies and gentlemen, on behalf of the government, I give you this radio station which belongs to the Guatemalan people, whom it should serve. Thank you. [applause]

CSO: 5500

UNDERSEA CABLE BREAK REPORTED

Johannesburg THE STAR in English 14 Sep 77 p 9

[Text]

Own Correspondent

CAPE TOWN — The undersea telecommunication cable that linked South Africa with the rest of the world has broken about 12 nautical miles from Melkbosstrand.

But there was no delay in overseas telecommunications traffic today, the Postmaster General said in Pretoria. All international links were restored this morning by standby satellite circuits.

The owners of the 5 800 nautical mile cable, which starts at Melkbosstrand and links up with the rest of the international telecommunication network at Lisbon, said the cable broke shortly after 10 o'clock last night.

The Cape-based maintenance vessel Cable Restorer sailed this morning to repair the break, but it is not yet known how long work will take.

A spokesman for the South Atlantic Cable Company said it was almost certain that the cable was not broken by a fishing vessel, as had been the case several times in the past.

He said the seabed where the break occurred was known to be exceptionally rocky and had resulted in a break in 1968.

The cable, which allows 360 simultaneous two-way conversations to take place, has been broken eight times in the past nine years.

CSO: 5500

METEOSAT TO AID WEATHER PREDICTION

Johannesburg THE STAR in English 15 Sep 77 p 5

[Text]

Pretoria Bureau

All systems are "go" for South Africa to start receiving photographs of its weather systems taken from an altitude of 36 000 km.

Meteosat, the first meteorological satellite to be put into space by the European Space Agency, is to transmit images of the earth's weather patterns at the rate of one every 30 minutes from December.

The spacecraft to be launched from Cape Canaveral on November 3 will be "parked" over the point where the Greenwich Meridian intersects the Equator. It will then be in a position to scan the earth from pole-to-pole and 70 degrees to both sides of the meridian.

Hartebeeshoek tracking station near Pretoria will receive coded signals from the satellite every half hour which will then in turn be transmitted to the Weather Bureau by normal post office lines.

"The new system will enable us to improve the accuracy of weather forecasting and this in turn will be of benefit to many sectors in South Africa," says Mr I Lloyd, Deputy Director of the Weather Bureau.

"We will be able to provide aircraft and shipping with more detailed reports on weather systems. Farmers and the fishing industry will also benefit," he said.

Images can be enlarged so that the paths of cold or warm currents can be seen.

Plankton tends to accumulate where cold water mixes with warm and this is where fish will be found. Fishermen can therefore be tipped off as to the precise location of such areas.

"We are still a long way from being able to forecast the weather perfectly but the new satellite will take us a little closer to the ideal," says Mr Lloyd.

CSO: 5500

MODERNIZATION OF TELECOMMUNICATIONS NETWORK DESCRIBED

Lome TOGO-PRESSE in French 20 Aug 77 p 4

[Article by Amoussa Salami]

[Text] Projects contained in the 3d Plan stress the modernization of the telecommunications network, the renovation of the cable networks and the adaptation of the equipment to techniques being utilized in telecommunications with other countries.

At the Commutation Level

Complete automatization and renovation of our present commutation equipment includes:
--one automatic R-6 central whose capacity was raised from 1,000 lines to 2,000 lines
--two Philips UR-43 central with 2,500 lines
--eight automatic centrals of the Crossbar type the orders for which were placed with CGCT [?General Telecommunications Company] in 1972 for Aneho, Tsevie, Kpalime, Atakpame, Sokode, Lama-Kara, Mango and Dapaon and which are connected to the Lome autocommutator.

The project, from the present until June 1977 [sic], will ensure the complete automatization of the domestic network through the installation of the new centrals in Kpalime (200 lines), Mango and Dapaon, those of Atakpame, Sokode and Lama-Kara (200 lines), being operational since 1975.

The project represented an expenditure of 840 million.

In Lome, the project involves expansion and modernization which not only fall within the general framework of a transformation of our telecommunications network but also within that of the integration of the telecommunication links with neighboring countries.

The automatic central in Lome, with the R-6, or Philips, with a 4,500-line capacity, does not permit satisfaction of the numerous requests for telephones; what is more, its condition and configuration justify the installation of equipment with greater capacity and reliability.

The cost of all this equipment totals 2.1 billion francs and the assignment of credits for the following operations:

--the installation of the 700-line telephone central, expandable to 10,000 lines, with a national transit center to assure automatic interurban transmissions;
--the installation of two small-capacity centers, 2,000 lines and 1,000 lines, connected with the principal central to service the port area and the northern sector of the capital;
--the construction of three buildings for the three centrals (200 million francs);
--the modernization and expansion of the telephone network (700 million francs).

The expansion of the telephone network during the 3d Plan should reach most of our urban centers but also the rural areas where we could install a primary infrastructure such as telephone booths.

Project for Communication by Hertzian Wave Clusters

Modernization also involves the telephone links. Since the end of June 1977, Togo has assured the routing of all communications between the large urban centers, thanks to its network of Hertzian wave clusters. This program falls within the framework of the entire PANAFTEL [?Pan-African Telecommunications Network] and includes three projects now being implemented:

--links by Hertzian wave clusters with Benin. The optical line-of-sight cluster between Lome and Cotonou passes through the corresponding Aneho station and that of Ouidah in the Benin network. This wave cluster was financed by FAC [Aid and Cooperation Fund] in the amount of 180 million CFA [African Financial Community] francs.

--Lome-Upper Volta link. This link is the extention of the present Lome-Lama-Kara link; six stations are needed to provide line-of-sight linkage with Upper Volta. The cost of the project to Togo is 565 million.

--Line-of-sight Hertzian wave cluster between Lome and Ghana. Talks are now in progress to convince Ghana to have a line-of-sight link with our Agou station, with its wave cluster passing through Ho on a 12-channel circuit.

The Lome-Ghana project for a large, 120-line coastal bank, expandable to 600 lines, falls within the PANAFTEL network. At the PANAFTEL meeting in Lome on 22 March 1977, ADB [African Development Bank] gave its approval to the dispatch of an evaluation mission to Ghana to conclude a loan agreement.

Satellite Communication Project

The Togo government, desirous of making reliable and good quality long distance communications available to the public, has decided to obtain a telecommunications earth satellite (TELSPACE).

The cost of the project, financed by BNP [National Bank of Paris] purchase credits, is approximately 2.4 billion (including equipment and buildings); and its placement in service is scheduled for April 1978; test reception is set for November 1977.

Other related projects can be associated with this action to renovate the telecommunications network to permit us to be masters of our communications with the outer world. These include:

--The international transit center will be completed at the beginning of 1979; the financing of this project is being studied at the present time by the Accord Council of the Ministry of Cooperation on the basis of data supplied by SOFRECOM [?French Telecommunications Research and Development Company];
--The acquisition of diverse telecommunications and telephone materials and equipment;
--The modernization of the Lome BCTR [expansion unknown] whose implementation should be rethought within the overall context of the exploitation by the earth station of our long distance telephone and telex communications with the outside world.

8143
CSO: 5500

TELECOMMUNICATIONS SATELLITE 'EKRAN' LAUNCHED

Moscow TASS in English 1154 GMT 21 Sep 77 LD

[Text] A telecasting satellite, the "Ekran" (screen), was launched in the USSR on Tuesday in accordance with the program of further development of telecasting systems with the utilization of artificial satellites of the earth. The onboard apparatus ensures the transmission of color and black-and-white programs of the central television in the decimeter waveband to the receiver network in Siberia and in the extreme north.

The satellite was put into a circular orbit which is close to a stationary one with the following initial parameters: The distance from the earth's surface--35,560 kilometers, the period of revolution around the earth--23 hours 45 minutes, orbital inclination--0.4 degree.

The apparatus is functioning normally.

The Ekran satellite has an international registration index, Stationar-t.

CSO: 5500   END